CLAIMS

I claim:

1. A contoured structural member, comprising:

at least one contoured inner layer comprising a composite material or a metal-containing material;

at least one contoured outer layer comprising a composite material or a metal-containing material;

at least one intermediate layer having a ribbed structure connecting the at least one inner layer and the art least one outer layer; and

an additional structural component.

2. The structural member of claim 1, wherein the structural member has a closed configuration.

3. The structural member of claim 1, wherein the metal-containing material is a light metal or alloy thereof.

4. The structural member of claim 1, wherein the metal-containing material is a heavy metal or alloy thereof.

5. The structural member of claim 1, wherein the structural component allows the structural member to be a vehicular component.

6. The structural member of claim 1, further comprising at least one initiator.

7. A complex, contoured structural member, comprising:

at least one contoured inner layer comprising a composite material or a metal-containing material;

at least one contoured outer layer comprising a composite material or a metal-containing material; and

at least one intermediate layer having a ribbed structure connecting the at least one inner layer and the art least one outer layer.

8. The structural member of claim 7, wherein the metal-containing material is a light metal or alloy thereof.

9. The structural member of claim 7, wherein the metal-containing material is a heavy metal or alloy thereof.

10. The structural member of claim 7, wherein the complex shape of the structural member allows the structural member to be a vehicular module.

11. The structural member of claim 7, further comprising at least one initiator.

12. The structural member of claim 1, wherein the composite material is a reinforced resin matrix material.

13. The structural member of claim 7, wherein the composite material is a reinforced resin matrix material.

14. The structural member of claim 1 or 7, wherein both the at least one inner layer and the at least one outer layer comprise a composite material.

15. The structural member of claim 1 or 7, wherein both the at least one inner layer and the at least one outer layer comprise a metal-containing material.

16. The structural member of claim 1 or 7, wherein the at least one inner layer comprises a composite material and the at least one outer layer comprises a metal-containing material.

17. The structural member of claim 1 or 7, wherein the at least one inner layer comprises a metal-containing material and the at least one outer layer comprises a composite material.

18. A contoured structural member, comprising:

at least one contoured inner layer comprising a composite material or a metal-containing material;

at least one contoured outer layer comprising a composite material or a metal-containing material;

at least one intermediate layer having a honeycomb structure connecting the at least one inner layer and the art least one outer layer; and

a structural component.

19. A closed, contoured structural member, comprising:

at least one contoured inner layer comprising a composite material or a metal-containing material;

at least one contoured outer layer comprising a composite material or a metal-containing material;

at least one intermediate layer having a honeycomb structure connecting the at least one inner layer and the art least one outer layer; and

a vehicular structural component.

20. A complex, contoured structural member, comprising:

at least one contoured inner layer comprising a composite material or a metal-containing material;

at least one contoured outer layer comprising a composite material or a metal-containing material;

at least one intermediate layer having a honeycomb structure being substantially contiguous with the at least one inner layer and the art least one outer layer; and

a vehicular structural component.

21. A method for making a contoured structural member, comprising:

providing at least one inner layer comprising a composite material or a metal-containing material;

roll wrapping at least one intermediate layer over the at least one inner layer, the at least one intermediate layer having a ribbed structure;

providing at least one outer layer over the at least one intermediate layer, the at least one outer layer comprising a composite material or a metal-containing material;

connecting the at least one inner and outer layer to the at least one intermediate layer; and

attaching a structural component.

22. The method of claim 21, including providing the at least one inner layer by roll wrapping the at least one inner layer over a substrate.

23. The method of claim 22, including providing the at least one outer layer by roll

wrapping the at least one outer layer over the at least one intermediate layer.

24. The method of claim 23, further including removing the substrate.

25. The method of claim 24, including partially or completely filling the interior created by removing the substrate.

26. The method of claim 25, further including constraining the at least one outer layer when connecting the at least one inner and at least one outer layer to the at least one intermediate layer prior to removing the substrate.

27. The method of claim 26, including constraining the at least one outer layer by roll wrapping at least one layer of a shrink-wrap material over the at least one outer layer.

28. The method of claim 27, including removing the at least one layer of the shrink-wrap material after the reaction.

29. The method of claim 27, further including providing at least one pressure distributor over the at least one outer layer.

30. The method of claim 29, including providing a plurality of layers of shrink-wrap material with the at least one pressure distributor between two of said layers.

31. A method for making a complex, contoured structural member, comprising:

roll wrapping at least one inner layer comprising a composite material or a metal-containing material over a complex substrate;

roll wrapping at least one intermediate layer over the at least one inner layer, the at least one intermediate layer having a ribbed structure;

roll wrapping at least one outer layer covering the at least one intermediate layer, the at least one outer layer comprising a composite material or a metal-containing material;

connecting the at least one inner and outer layer to the at least one intermediate layer;

removing the substrate; and

attaching a structural component.

32. The method of claim 31, the shape of the mandrel providing the complex shape of the structural member.

33. The method of claim 31, the structural member being a vehicular module.

34. A method for making a contoured structural member, comprising:

roll wrapping at least one inner layer comprising a composite material or a metal-containing material over a substrate;

roll wrapping at least one intermediate layer over the at least one inner layer, the at least one intermediate layer having a ribbed structure; and

roll wrapping at least one outer layer covering the at least one intermediate layer, the at least one outer layer comprising a composite material or a metal-containing material;

constraining the outer portion with a shrink-wrap material;

connecting the at least one inner and outer layer to the at least one intermediate layer;

removing the shrink-wrap material and the substrate; and

attaching a structural member.

35. A method for making a contoured structural member, comprising:

roll wrapping at least one inner layer comprising a composite material or a metal-containing material over a substrate;

roll wrapping at least one intermediate layer having a honeycomb structure to be substantially contiguous with the at least one inner layer; and

roll wrapping at least one outer layer to be substantially contiguous with the at least one intermediate layer, the at least one outer layer comprising a composite material or a metal-containing material;

constraining the outer portion with a shrink-wrap material;

connecting the at least one inner and outer layer to the at least one intermediate layer;

removing the shrink-wrap material and the substrate;

attaching a structural member.

36. A contoured structural member made by the method comprising:

providing at least one inner layer comprising a composite material or a metal-containing material;

roll wrapping at least one intermediate layer over the at least one inner layer, the at least one intermediate layer having a ribbed structure;

providing at least one outer layer over the at least one intermediate layer, the at least one outer layer comprising a composite material or a metal-containing material;

connecting the at least one inner and outer layer to the at least one intermediate layer; and

attaching a structural component.

37. A complex, contoured structural member made by the method comprising:

roll wrapping at least one inner layer comprising a composite material or a metal-containing material over a complex substrate;

roll wrapping at least one intermediate layer over the at least one inner layer, the at least one intermediate layer having a ribbed structure;

roll wrapping at least one outer layer covering the at least one intermediate layer, the at least one outer layer comprising a composite material or a metal-containing material;

connecting the at least one inner and outer layer to the at least one intermediate layer;

removing the substrate; and

attaching a structural component.

38. A contoured structural member made by the method comprising:

roll wrapping at least one inner layer comprising a composite material or a metal-containing material over a substrate;

roll wrapping at least one intermediate layer over the at least one inner layer, the at least one intermediate layer having a ribbed structure; and

roll wrapping at least one outer layer covering the at least one intermediate layer, the at least one outer layer comprising a composite material or a metal-containing material;

constraining the outer portion with a shrink-wrap material;

connecting the at least one inner and outer layer to the at least one intermediate layer;

removing the shrink-wrap material and the substrate; and

attaching a structural member.

39. A contoured structural member made by the method comprising:

roll wrapping at least one inner layer comprising a composite material or a metal-containing material over a substrate;

roll wrapping at least one intermediate layer over the at least one inner layer, the at least one intermediate layer having a ribbed structure; and

roll wrapping at least one outer layer covering the at least one intermediate layer, the at least one outer layer comprising a composite material or a metal-containing material;

constraining the outer portion with a shrink-wrap material;

connecting the at least one inner and outer layer to the at least one intermediate layer;

removing the shrink-wrap material and the substrate; and

attaching a structural member.